## Success Story

# **EFFECT OF MODIFIED SEED DRILL ON SOYBEAN PRODUCTION UNDER ERRATIC CLIMATIC SITUATION: A SUCCESS STORY**

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## ABSTRACT

As a result of climate change during the last decade, the rainfall pattern and distribution has been exhibited frequent erratic situation of sudden downpour or long dry spells entailing in to severe stress on soybean crop that results reduction in yield. Keeping the above facts, the act of *in- situ* rain water management strategies for minimizing risk of crop failure and stabilizing soybean production was felt. Under such circumstances, KVK Panna of Madhya Pradesh introduced modified ridge and furrow equipment to line sowing of soybean through front line demonstration at farmer's field. These demonstrations brought out enhancement in yield of soybean as 22.5 q/ha over farmers practice 11.2 q/ha. The benefit cost ratio was recorded as 1:3.8 as compared to farmer's practices 1:2.0. The ridge and furrow equipment save the soil moisture through increased infiltration rate of rain fall and reduced runoff that leads slow rate of soil erosion. The furrow which allows drainage of excess water in case of heavy precipitation, while serves as *in situ* moisture conservation during dry spells, thus mitigating the detrimental effects of excess and dry spell situation.

## INTRODUCTION

Soybean (Glycine max L.) has become an important and economic kharif crop of the Madhya Pradesh. The district Panna, which is situated in Kymore Plateau and Satpura hills, is witnessing the soybean crop as an emerging important kharif crop of the district. The area under soybean cultivation in Panna district is around 15000 ha during 2012-13. During kharif season, broadcasting method of sowing in soybean is usually practiced in the district. Generally farmers do not prepare the field properly for getting proper tilth conditions due to either continuous or intermittent rainfall; hence they prefer broadcasting method of sowing for soybean. Only few farmers use the seed drill for line sowing of soybean but they do not maintain the proper row to row spacing, generally they maintain 22.5 cm distance. During crop season, if heavy rains occur just after sowing either by broadcast or seed drill, the seeds get deteriorated. To overcome this problem, a modification was made in traditional seed drill to make ridge and furrows. In this modified seed drill, seed is placed on the ridges and furrows allow draining of the excess water. At the same time, if less precipitation

occurs furrows conserve the water (moisture) which is used for the growth of plant that ultimately results in desirable plant population. Through this modified seed drill, row to row spacing is maintained (45cm) which is recommended for the soybean crop.

## INSTITUTIONAL INVOLVEMENT

Krishi Vigyan Kendra Panna introduced modified seed drill by modification in the traditional seed drill, manufactured by Directorate of Soybean Research, Indore. Madhya Pradesh, through front line demonstrations of varietal performance, which also make ridge and furrows. The modification in traditional seed drill was made by replacing tines through attaching the shovel and stopped of the every out let of back tines from seed drill. Looking to the performance of technology, it spread horizontally very fast in the district as sowing through modified seed drill makes ridge and furrow that save the seeds getting deteriorated due to heavy soil moistures, maintains optimum plant population and ultimately increases the yield. The line sowing with row spacing of 45 cm also facilitates the other cultural operations such as spraying of

insecticides, weedicides, use of hand hoe, cycle hoe etc. for the management of weeds and insect pests.

In this modified method of sowing, 25 kg seeds/acre is required while in broadcasting method farmers were using 40-45 kg/acre and even they were not able to obtain desirable plant population thus, 15-20 kg seed is saved per acre. Fewer labourers are also required for the control of weeds and insect pests as well as for harvesting. Thus, this technology reasonably brings down the demand of laboures (20-25%) and inputs (12-15%) as it reduces the infestation of weeds and insect pests. As the plants get almost equal chance for nutrient and moisture absorption for their growth which results in uniform growth of plants that leads greater seed size which contributed higher yields and higher income. During 2012-13, the horizontal spread of the modified seed drill increased by 55.8 per cent. Out of 360 ha area under soybean crop in the village, sowing of soybean crop by this modified seed drill around 201 ha.

# SUCCESS POINT/RESULTS

The maximum yield was obtained from the modified seed drill sown crop (22.5 q/ha) than the broadcasting (11.2 q/ha) (Table 1). It is clearly evident from the

economic analysis that maximum gross return (Rs. 67500 /ha), net return (Rs. 51250/ha) and B: C ratio (1:3.8) was obtained from modified seed drill sowing crop than the broad casting (Rs. 33300/ha), (Rs. 17654/ha) and (1:2) respectively. Because soybean crop sown with modified seed drill is attributed to appropriate cover of seeds by well pulverized soil that allow abundant quantity of moisture and oxygen to the seeds for proper germination and growth of seedlings. This sowing method not only conserves the soil moisture for plant growth but also drain out the excess water without causing soil erosion. In addition, the furrow act as in-situ soil moisture conservation hence mitigates the detrimental effects of dry spell to the crop. A progressive farmer Basant Lal Patel, village-Richhora, block- Gunor district- Panna adopted this technology for the sowing of soybean during kharif season. Before the introduction of this technology, the average production of the farmer was 10-12.5q/ha. Now farmer is getting 20-22 q/ha soybeans using this technology. A brief social status of the farmer is described as follows:

Particulars	Improved technology	Farmers technology
Land	10 ha.	-
Source of irrigation	Tube well	Tube well
Agricultural implements	Tractor, Seed cum ferti	Tractor, Seed cum ferti
	drill, Rotary tiller etc.	drill, Rotary tiller etc.
Production	22.5 qt/ha.	11.2 qt/ha
Cost of cultivation	Rs. 17550/ha.	15646
Gross income	Rs. 67500/ha.	33300
Net income	Rs.51250 Rs. /ha	17654
BC ratio	1:3.8	1:2.0

Table 1. Performance of modified seed drill on soybean yield

## **OUTCOME/EXTENSION ASPECTS**

In this modified method of sowing, 70kg seeds/ha is required while in broadcasting method of sowing farmers using 100-110 kg seeds/ha, were not able to obtain desirable plant population thus, 30-40 kg seed is saved. Fewer labourers are also required for the control of weeds and insect pests as well as for harvesting. Thus, this technology reasonably brings down the demand of laboures (20-25%) and inputs (25-30%) as it reduces the infestation of weeds and insect pests. In addition, this modified seed drill does not require high power tractor and reversible mould board plough for making ridge and furrow. The cost of modified seed drill is also not expensive hence easily acceptable to large number of farmers.

#### CONCLUSION

It is concluded that the higher production of soybean crop may be obtained in adverse climatic situation during *kharif* season by using modified seed drill that makes ridge and furrow. Thus there is a large scope to increase the production and productivity of soybean crop by this technology through wide extension activities such as literature, training to farmers and extension personnel and field demonstration in India especially in soybean growing states.



Fig. 1. Attached modified ridge and furrow



Fig. 2. Modified ridge and furrow



Fig. 3. Sowing of crop with modified seed drill



Fig. 4. Full canopy development stage

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